



Mathematical Games, Part 2

Sept. 17, 2016

Matches

A box contains 300 matches. Players take turns removing no more than half the matches in the box. The player who cannot move loses.

Students: try to find a winning strategy. To describe a winning strategy, you have to explain what the winning player should do in order to win, no matter what the opponent does.

Extra Game: Sum to 23

This game begins with the number 0. In one turn, a player can add 1, 2, or 4. The player who reaches exactly 23 wins.

Two Pile Nim

There are two piles of pennies, one with 7 pennies and one with 10 pennies. Players take turns taking as many pennies as they want from just one pile. The player who cannot move (because there are no pennies left) loses.

Students: try to find a winning strategy. To describe a winning strategy, you have to explain what the winning player should do in order to win, no matter what the opponent does.

Extra Game: Puppies and Kittens. There is a pile of puppies and a pile of kittens. Players take turns taking as many puppies as they want, or as many kittens as they want, or an equal number of puppies and kittens. The player who cannot move, because there are no puppies or kittens left, loses.

The Game of Stix

This is a game for 2, 3 or 4 players. You'll need a special set of 55 playing cards and 5 sticks. Shuffle the deck and deal off one card – put it face up in the middle – it is the set up card. Arrange the sticks to match the pattern on the set up card. Deal each player five cards, face-down. The remaining cards form the draw pile. Each player picks up their cards and looks at them. The first player plays by moving one stick to make the new stick pattern match the pattern on one of their cards OR a reflection or rotation of the pattern on one of their cards. If they are able to do that, then they put that card face up on top of the set up card. If they are unable to do so, then they draw a card from the draw pile. Then play passes to the person on their left. The goal is to get rid of all your cards first. This game can be trickier than you think it would be. For that reason, first time players might want to play with open hands. Everyone puts their cards out for all to see. This way, players can help each other. Remember, reflections and rotations of patterns are considered equivalent.